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ABSTRACT

This study examined rural/urban and sex differences in achievement in reading, language, and mathematics for 4918 students in grades 4, 7, and 10 from a midwestern province in Canada. Particular attention was given to subskill and sex differences in mathematics achievement. Each student was administered a mental ability test and an achievement battery by the classroom teacher. A two-factor (sex, jurisdiction) multivariate and univariate analysis of covariance was performed on the data. Students from rural schools attained superior achievement in a majority of the subtests. The analysis of subtests and subskills in mathematics indicated a significant male superiority which appeared to be developmental. (MNS)

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Sex and Jurisdiction Differences in Achievement[1]

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Abstract

A large sample (N = 4918) of Grade 4, 7 and 10 students from a mid-western province in Canada were administered a mental ability test and an achievement battery. Jurisdiction as well as sex differences in achievement, when controlled for ability, were examined. A particular interest of the study was the examination of sex differences in mathematics. Rural superiority in achievement in a majority of subtests was obtained. The analysis of the subtests and subskills in mathematics indicated a significant male superiority which appeared to be developmental.

Sex and Jurisdiction Differences in Achievement

Sex differences in achievement and ability are reported in numerous studies (Bachman, 1972; Ernest, 1976; Fennema, 1974; Fox, 1976; Fox, Brody & Tobin, 1980; Garai & Scheinfeld, 1968; Glennon & Callahan, 1968; Keating, 1974; Maccoby & Jacklin, 1974; National Assessment of Educational Progress, 1975; Suydam & Weaver; Very, 1967; Wilson, 1972). General achievement and ability differences in high school populations usually are such that females score better than males in verbal tests and boys score better than females in quantitative tests. Some investigators argue that differential course-taking in high school results in the apparently superior mathematical reasoning ability of males (Fennema & Sherman, 1977). An alternative to the differential course-taking explanation for the observed sex differences in mathematical achievement and ability could be that "less well-developed mathematical reasoning ability contributes to females taking fewer mathematics courses and achieving less than males" (Benbow & Stanley, 1980, p. 1262). Benbow and Stanley (1980, 1981) found large and consistent sex differences at the seventh-grade level in mathematical reasoning ability favoring males. At the seventh-grade level formal mathematics is similar for males and females. Thus, the Benbow and Stanley (1980, 1981) results point to the implausibility of the hypothesis that differential course-taking by males and females in mathematics causes the sex difference in mathematical reasoning ability at this particular grade level (Fennema & Sherman, 1977). Also, Lantz and Smith (1980) reported no sex-related differences in actual enrolment or in intention to enrol in mathematics courses in three separate samples.

In view of the equivocal evidence on differential course enrolment as a critical variable in explaining sex differences in mathematics achievement and ability, it could be argued that a member of alternative hypotheses are

possible. One of these could be that males and females differently retain various kinds of mathematical content and these differences in retention become critical when assessments of mathematics achievement are undertaken. Specifically, retention differences might exacerbate the achievement differences in mathematics on tests which involve comprehension and application of mathematical content. The present study examined sex differences in achievement in verbal and quantitative areas at three grade levels where the males' and females' formal exposure to these courses is similar. A particular interest of the present study was to go beyond the global achievement differences and to examine the specific mathematical subskill differences.

It should be pointed out that Benbow and Stanley (1980, 1981, 1982) examined mathematics achievement, enrolments, and many other variables for the participants in the Study of Mathematically Precocious Youth. Their samples, therefore, consisted of the 2 to 5% of the high achievers on standardized ability tests over a number of years. The generalizability of their findings to representative samples of normal ability ranges found in regular classrooms, school districts, provinces/states, and so on, is not possible. While they admitted this limitation, "A possible criticism of our results is that only selected mathematically able, highly motivated students were tested" (Benbow & Stanley, 1980, pp. 1263-1264), they defended it in terms of the participation rates of precocious youth in further mathematics study and in terms of Ernest's (1976) concern about the lack of participation of intellectually able females. They did not address the issue of differentials in achievement. The present study examined the achievement differentials of males and females in the entire normal range of ability in a representative sample.

Also, it should be noted that none of the above studies examined rural - urban differences in achievement. Randhawa and Fu (1973) point out that a

considerable amount of material has been written about rural pupils and many ideas advanced to account for rural pupils being disadvantaged in terms of the larger society (Jenkins, 1963; Taylor & Jones, 1963). For example, it is reported that socioeconomic status of rural youth plays an important role in aspirations (Taylor & Jones, 1963), and achievement (Kimble et al., 1976). Kimble et al. reported that different variables affected achievement in different ways in rural schools and urban schools of Montana. They further stated that socioeconomic status had the most influence on achievement. Taylor and Jones (1963) stated that, when emphasis on formal education was lacking, as in farm families, the youth involved did not perceive education as a dominant value and consequently were not motivated to obtain education. The Taylor and Jones study and another (Sperry et al., 1965) indicated that rural youth from a higher socioeconomic level had higher educational aspirations and took greater advantage of educational opportunities than rural youth from lower socioeconomic levels.

A member of studies (Ackerson, 1967, Edington, 1971; Lamanna & Samora, 1967; White & Sweeten, 1974) have shown that rural or urban residence is strongly related to educational status. Urban residents are almost always better educated than rural residents, regardless of age, sex, maturity, race, or parentage. Rural pupils are usually characterized by poor academic achievement as compared with urban pupils (Edington, 1971; White & Sweeten, 1974). However, a study of grade three children in Alberta, Canada demonstrated that children from non-urban schools performed better than those from urban schools in reading, mathematics, and language (Clarke et al., 1980). The present study examined rural urban differences in achievement in the core subjects for three grade levels and, in particular, subskill differences in mathematics achievement tests.

In view of the ambiguity of the research findings presented above, the following hypotheses were the focus of the present study:

1) The mean achievement profiles of males and females in each of the three samples (Grade 4, 7, and 10) will be equivalent.
2) The mean subskill profiles derived from each of the two mathematics tests for males and females in each of the three samples will be equivalent.
3) The mean achievement profiles of pupils from the rural and urban settings for each of the three samples will be equivalent.
4) The mean subskill profiles derived from each of the two mathematics tests of pupils from the rural and urban settings for each of the three samples will be identical.
5) There will be no significant interaction between sex and setting, either for achievement or mathematics subskill profiles.

Method

Sample

Each school jurisdiction in a mid-Western province in Canada was requested to provide a list of classrooms for Grades 4, 7, and 10. From this list, a 10 percent random sample of classrooms was obtained. If a jurisdiction did not have at least six classrooms in any one grade, then these classrooms were pooled as one separate unit. From this separate pool of classes for each grade, a further 10 percent sample was drawn. Using this procedure, 1425, 1591, and 1902 students were included in Grades 4, 7, and 10 respectively.

Instruments

Each Grade 4 and 7 student was administered the Otis-Lennon Mental Ability Test (OL), Form J (Otis & Lennon, 1969) and the Canadian Tests of Basic Skills (CTBS), Form 4M (King, 1977). Each Grade 10 student was administered the Sequential Tests of Educational Progress (STEP), Series 2, Form 2A (Educational Testing Service, 1971) and the OL, form J. Grade 4, 7, and 10 students were given, respectively, the elementary, intermediate, and advanced levels of the OL.

Procedure

All the testing in a school jurisdiction was coordinated by the Superintendent/Director of Education or his designate. Students were administered the tests in their schools by the classroom teachers over a period of three weeks. The completed answer sheets from each school were forwarded to the jurisdiction coordinator who forwarded the entire set to the central office for checking, coding and scoring.

Analysis

A two-factor (Sex X Jurisdiction) multivariate and univarate analysis of covariance (MANCOVA & ANCOVA) was used to examine the Sex and Jurisdiction

effects. The first analysis was carried out using the CTBS and the STEP subtest raw scores as dependent variables for each grade level. The second analysis was carried out using the subskill raw scores within each of the two mathematics subtests as dependent variables for each grade level. The OL raw scores were used as a covariate.

Results

Grade 4

The adjusted and observed means for jurisdiction and sex classifications are given in Table 1. There was a significant multivariate jurisdiction effect

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Insert Table 1 about here

[$F(8,1317)=4.68, p<.01$] for the CTBS subtest rawscores. This result rejects the hypothesis of equivalence of mean profiles for Rural and Urban students. As shown in Table 1, the corresponding significant univariate differences in favour of rural students were obtained on Punctuation, Capitalization and Mathematics Concepts (MC) subtests, whilst on the Vocabulary subtest the urban students outperformed the rural students.

A significant multivariate sex effect was obtained [$F(8,1317)=13.80, p<.01$]. This result negates the hypothesis of equivalence of mean profiles for male and female students. As indicated in Table 1, the corresponding significant univariate differences in favour of females were obtained on the Spelling, Capitalization, Punctuation, and Usage subtests, whilst on the Mathematics concepts subtest the males outperformed the females.

When the MC subskills were analyzed with OL as a covariate a significant sex effect was obtained [$F(8,1338)=8.96, p<.01$]. This result rejects the hypothesis of equivalence of mean MC subskills profiles for males and females.

There were significant univariate differences in favour of males on the Currency (1), Measurement (3), Whole Numbers (11) and Ratio and Proportion (1) subskills, whilst the females outperformed the males on the Equations, Inequalities and Number sentences (2) subskills. The number of items involved in these subskills are shown in the parentheses. No significant jurisdiction multivariate effect was obtained. This result upholds the hypothesis of equivalence of mean MC subskills profile for Rural and Urban students.

When the Mathematics Problems (MP) subskills were analyzed, no significant multivariate effects were obtained. These results uphold the hypotheses of equivalence of mean MP subskills profiles for males and females and for Urban and Rural students.

Grade 7

The adjusted and observed means for jurisdiction and sex classification are given in Table 2. there was a significant multivariate Jurisdiction effect

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Insert Table 2 about here

[$F(8,1484)=4.32, p<.01$] for the CTBS subtests raw scores. This result rejects the hypothesis of equivalence of mean profiles for Rural and Urban students. As shown in Table 2, the corresponding significant univariate differences in favour of urban students were obtained on Vocabulary and MP subtests, whilst on the Spelling and Punctuation subtests the Rural students outperformed the urban students.

A significant multivariate sex effect was obtained [$F(8,1484)=30.12, p<.01$]. This result negates the hypothesis of equivalence of mean profiles for male and female students. As indicated in Table 2, the corresponding significant univariate difference in favour of females were obtained on the Reading,

spelling, Capitalization, Punctuation and Usage subtests, whilst on the MP subtest the males outperformed the females.

When the MP subskills were analyzed using OL as a covariate, a significant sex effect was obtained [$F(8,1522)=11.25, p<.01$]. This result rejects the hypothesis of equivalence of mean MP subskills profiles for males and females. There were significant univariate differences in favour of males on the Decimals (3), Fractions (10), Percents (3), Ratio and Proportion (1) subskills, whilst the females outperformed the males on the Currency (8) and whole numbers (4) subskills. The number of them involved in these subskills are shown in parentheses. No significant jurisdiction multivariate effect was obtained.

When the MC subskills were analyzed using OL as a covariate, a significant sex effect was obtained [$F(10,1516)=11.61, p<.01$]. This result rejects the hypothesis of equivalence of mean MC subskills profiles for males and females. There were significant univariate differences in favour of males on the Measurement (2), Percents (1), Ratio and Proportion (2), and Whole Numbers (5) subskills, whilst the females outperformed the males on the Numeration and Number System (10) and Sets (2) subskills. There was no significant multivariate Jurisdiction effect. This result upholds the hypothesis of equivalence of mean MC subskills profile for Rural and Urban students.

Grade 10

The adjusted and observed means for jurisdiction and sex classifications are given in Table 3. There was a significant multivariate Jurisdication

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Insert Table 3 about here

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effect [$F(6,1749)=3.47, p<.05$] for the STEP subtests raw scores. This result rejects the hypothesis of equivalence of mean profiles for rural and Urban

students. As shown in Table 3, the corresponding significant univariate differences in favour of rural students were obtained on the Capitalization and Punctuation, and English Expressions subtests.

A significant multivariate sex effect was obtained [$F(6,1749)=62.0, p<.01$]. This result negates the hypothesis of equivalence of mean profiles for male and female students. As indicated in Table 3, the corresponding significant univariate differences in favour of females were obtained in Reading, Spelling, Capitalization and Punctuation, English Expression and Mathematics Computation (MC) subtests, whilst on the Mathematics Basic Concepts (MBC) subtest the males outperformed the females.

When the MC subskills were analyzed using OL as a covariate, a significant sex effect was obtained [$F(5,1797)=18.31, p<.01$]. This result rejects the hypothesis of equivalence of mean MC subskills. There were significant univariate sex differences in favour of males on the Denominate Numbers (6), whilst the females outperformed the males on Whole Numbers (7) and Fractions (14) subskills. The number of items involved in these subskills are shown in parentheses. No significant jurisdiction main effect was obtained. This result upholds the hypothesis of equivalence of mean MC subskills profile for Rural and Urban students.

When the MBC subskills were analyzed using OL as a covariate, a significant sex effect was obtained [$F(3,1804)=10.28, p<.01$]. This result rejects the hypothesis of equivalence of mean MBC subskills profiles for males and females. There were signficiant univariate sex differences in favour of males on Recall of Facts and/or Perform Mathematical Manipulation (17), and Exercise Ingenuity or Higher Mental Process (10). the number of items involved in these subskills are shown in parentheses. No significant jurisdiction main effect was

obtained. This result upholds the hypothesis of equivalence of mean MBC subskills profile for Rural and Urban students.

No significant Sex and Jurisdiction effects were obtained throughout hence the hypothesis of no interaction either for achievement or mathematics subskills profiles was supported.

Discussion

The Clarke et al study (1980), which used a Grade 3 Alberta Provincial sample, found that children from non-Urban schools performed better than those from Urban schools in reading, mathematics and language. It is difficult to reach a generalized conclusion such as in the Clarke et al study (1980) and others (Edington, 1971; White & Tweeton, 1974) who reported Urban superiority in achievement, when global measures are used, and no statistical control for general ability is used in the data analysis. It is conceivable that the conclusions of these studies would have been different had they used component measures and controlled for general ability as in the present study. However, our results are still consistent with the Clarke et al results for Capitalization, Punctuation, and Mathematical Concepts in Grade 4, Spelling, and Punctuation in Grade 7, and Capitalization and English Expression in Grade 10. On the other hand our results also agree with those of Edington (1971) and White and Tweeton (1974) for Vocabulary in Grade 4 and 7 and Mathematics Problems in Grade 7. Therefore, from these observations it would appear that rural-Urban differences ought to be interpreted in terms of specific tasks which have been controlled for general ability if an accurate picture is to be obtained.

When the subskills on the two mathematics tests were analyzed separately for each grade level, no significant multivariate jurisdiction was obtained. In spite of the fact that the global analysis of mathematics tests resulted in

a significant univariate differences, the subskills did not. This may be partly due to the unreliability of the subskill scores derived from combining smaller number of items in these tests. It is intersting, however, to conjecture that if more reliable subskill measures were available, the outcomes might have been different.

Almost all research into sex differences has borne out the fact of the superiority of females on tasks involving verbal ability (Maccoby & Jacklin, 1974). The present research substantiates this finding at all three grade levels. In all the subtests, other than the mathematics ones, the differences, if any, were in favour of females. Any differences in the mathematics subtests that appeared in Grades 4 and 7 were in favour of the males. At the Grade 4 and 7 levels, the mathematics subtests are divided into knowledge of mathematical concepts and competence at problem solving. At the Grade 10 level the subtests are divided into knowledge of mathematical concepts and competence at mathematical computation. At the Grade 10 level, in the subtest involving concepts, the males still maintained their superiority, but in the subtest involving computation, the females were better than the males. This result again substantiates previous research, in which the superiority of females over males in mathematics consisting of straight computation has been shown (National Assessment of Educational Progress, 1975). It would appear that the significant sex difference in favour of males in the understanding of concepts that exists at the Grade 4 level has disappeared at the Grade 7 level. One possible explanation could be found in the change of curriculum that took place in the province from 1975 to 1978. A change from a normative approach to a performance criterion approach was established. The latter, because of the need for much more drilling and the necessity of working to criteria could, at the Grade 7 level, have produced a ceiling effect in the males on some

subskills, whereas the females would increase their performance. This fact became evident when the subskills were analyzed, when this non-significant sex effect became significant with the males being superior to the females in four out of the six significant subskills.

In the Mathematics Problem Solving subskills analysis, there was a trend from a no significant sex differences at Grade 4 to a significant sex difference at Grade 7 and 10. At Grade 7 the males were superior in four out of the six significant subskills, whilst at Grade 10 the males were superior on both significant subskills. One of these subskills, namely, Exercise Ingenuity or Higher Mental Processes, demands going beyond the information and using some degree of logical thought.

Overall, it would seem that with this large, representative sample, there appears to be a significant male superiority in mathematics and that this difference appears to be developmental. The theory of differential course work exposure (Fenema & Sherman, 1977) does not apply in this case, as mathematics at the grades 4 and 7 are compulsory courses; however, because of the different tests used at the Grade 10 level and the fact that the present study was not a longitudinal one, conclusive evidence cannot be presented for an innate explanation of male mathematical competence.

References

Ackerson, N. J. (1967). Rural youth in a changing world. Paper presented at the National Outlook Conference on Rural Youth, Washington, D.C.

Backman, M. E. (1972). Patterns of mental abilities. Ethnic, socioeconomic, and sex differences. American Educational Research Journal, 9, 1-12.

Benbow, C. P., & Stanley, J. C. (1980). Sex differences in mathematical ability: Fact or fiction? Science, 210, 1262-1264.

Benbow, C. P., & Standley, J. C. (1981). Mathematical ability: Is sex a factor? Science, 212, pp. 118, 121.

Benbow, C. P., & Stanley, J. C. (1982). Consequences in high school and college of sex differences in mathematical reasoning ability: A longitudinal perspective. American Educational Research Journal, 19, 598-622.

Clarke, S. T. C., Nyberg, V., & Worth, W. H. (1980). Alberta grade 3 achievement study. Fall 1978. Alberta Department of Education, Edmonton, Canada. ERIC Document No. ED 179 552.

Edington, E. D. (1971). A summary of research in rural education: Testimony to the U.S. Senate Select Committee in Equal Educational Opportunity. U.S. Department of Health, Education and Welfare, Office of Education, Washington, D.C. ERIC Document No. ED 053 842.

Educational Testing Service. (1971). Sequential tests of educational progress, Series II, Form 2A. Princeton, N.J.: Educational Testing Service.

Ernest, J. (1976). Mathematics and sex. American Mathematical Monthly, 83 (8), 595-612.

Fennema, E. (1974). Mathematics learning and the sexes: A review. Journal for Research in Mathematics Education, 5, 126-139.

Fennema, E., & Sherman, J. (1977). Sex-related differences in mathematics achievement, spatial visualization, and sociocultural factors. American Educational Research Journal 14, 51-71.

Fox, L. H. Sex differences in mathematical precocity: Bridging the gap. (1976). In D. P. Keating (Ed.), Intellectual talent: Research and development. Baltimore, Md.: Johns Hopkins University Press.

Fox, L. H., Brody, L. & Tobin, D. (Eds.). (1980). Women and the mathematical mystique. Baltimore, Md.: Johns Hopkins University Press.

Garai, J. E., & Scheinfeld, A. (1968). Sex differences in mental and behavioral traits. Genetic Psychology Monographs, 77, 169-229.

Glennon, V. J., & Callahan, L. G. (1968). A guide to current research: Elementary school mathematics. Washington, D.C.: Association for Supervision and Curriculum Development.

Jenkins, R. L. (1963). Incidence of emotional disturbance and mental illness among rural children and youth. Washington, D.C.: National Committee for Children and Youth.

Keating, D. P. (1974). Study of Mathematically Precocious Youth. In J. C. Stanley, D. P. Keating, & L. H. Fox (Eds.), Mathematical talent: Discovery, description, and development. Baltimore, Md.: Johns Hopkins University Press.

Kimble, J. W., Cramer, G. L., & House, V. W. (1976). Basic quality of secondary education in rural Montana. Bulletin 685. Bozeman, Montana: Montana State University. ERIC Document No. ED 212 418.

King, E. M. (1977). Canadian tests of basic skills, Form 4M. Toronto: Thomas Nelson.

Lamanna, R. A., & Samora, J. (1967). Recent trends in educational status of Mexican Americans South Bend, Indiana: University of Notre Dame.

Lantz, A. P., & Smith, G. P. (1980). Determining the importance of factors influencing the election of mathematics courses. Final report. National Science Foundation Grant SED 78-171003.

Maccoby, E. E., & Jacklin, C. N. (1974). The psychology of sex differences. Stanford, Calif.: Stanford University Press.

National Assessment of Educational Progress. (1975). Males dominate in educational success. National Assessment of Educational Progress Newsletter. 8 (5), insert.

Otis, A. S., & Lennon, R. T. (1969). Otis-Lennon mental ability test: Form J. N.Y.: Psychological Corporation.

Randhawa, B. S., & Fu, L. W. (1973). Assessment and effect of some classroom environment variables. Review of Educational Research, 43, 303-321.

Sperry, I. V., & others. (1965). Educational and vocational goals of rural youth in the South. Bulletin 107, Southern Cooperative Series. Raleigh, North Carolina: North Carolina State University. ERIC Document No. ED 012 743.

Suydam, M. N., & Weaver, J. F. (1970). Individualizing instruction. Washington, D.C.: U.S. Office of Education.

Taylor, L., & Jones, A. R. (1963). White youth from low-income rural families: Achievement milieu and agribusiness opportunities. Paper presented at the National Conference in Problems of Rural Youth in a Changing Environment, Washington, D.C.

Very, P. S. (1967). Differential factor structures in mathematical ability. Genetic Psychology Monographs, 75 (2), 169-207.

White, F., & Tweeten, L. (1974). Planning educational services for rural areas. ERIC Document No. ED 091 133.

Wilson, J. W. (1972). Patterns of mathematics achievement in grade 11: Z population. Stanford, Calif.: School Mathematics Study Group.

Table 1

Grade 4 Observed and Adjusted Subtest Means for Jurisdiction and Sex

Subtest	Jurisdiction		Sex	
	Urban	Rural	Male	Female
Vocabulary	19.7* (20.3)[a]	19.2 (18.6)	19.2 (18.8)	19.6 (19.7)
Reading	38.2 (39.2)	38.2 (37.1)	38.0 (37.3)	38.3 (38.5)
Spelling	21.5 (22.0)	22.1 (21.5)	20.7** (20.4)	22.8 (23.0)
Capitalization	17.7** (18.1)	19.1 (18.1)	17.7** (17.6)	19.1 (19.4)
Punctuation	17.1* (17.6)	17.9 (17.4)	16.6** (16.3)	18.4 (18.6)
Usage	16.1 (16.6)	16.0 (15.5)	15.5** (15.2)	16.6 (16.7)
Math. Concepts	18.3* (18.8)	18.9 (18.4)	19.1** (18.8)	18.1 (18.3)
Math. Problems	12.7 (13.1)	13.1 (12.7)	13.1 (12.8)	12.7 (12.9)

[a]Observed means in parentheses

*$p < .05$

**$p < .01$

Table 2

Grade 7 Observed and Adjusted Subtest Means for Jurisdiction and Sex

Subtest	Jurisdiction		Sex	
	Urban	Rural	Male	Female
Vocabulary	25.2* (25.8)[a]	24.6 (23.9)	24.9 (24.1)	25.0 (25.1)
Reading	40.8 (41.8)	41.1 (39.9)	40.0** (38.9)	41.9 (42.3)
Spelling	21.4* (21.7)	22.1 (21.5)	20.0** (19.5)	23.5 (23.9)
Capitalization	22.8 (23.1)	23.0 (22.4)	21.5** (21.0)	24.3 (24.6)
Punctuation	20.3** (20.6)	20.9 (20.4)	19.2** (18.7)	22.1 (22.4)
Usage	15.4 (15.2)	15.6 (15.2)	14.7** (14.3)	16.3 (16.5)
Math. Concepts	24.0 (24.6)	24.4 (23.8)	24.3 (23.7)	24.1 (24.4)
Math. Problems	14.1* (14.4)	13.6 (13.3)	14.0* (13.6)	13.7 (13.7)

[a] Observed means in parentheses

*p<.05

**p<.01

Table 3

Grade 10 Observed and Adjusted subtest Means for Jurisdiction and Sex

	Jurisdiction		Sex	
	Urban	Rural	Male	Female
Reading	34.4 (35.0)[a]	34.1 (33.6)	33.5** (33.6)	35.0 (34.7)
Spelling	24.7 (25.1)	25.2 (24.9)	23.2** (23.3)	26.7 (26.7)
Capitalization and Punctuation	24.0** (24.4)	24.8 (24.4)	22.6** (22.7)	26.2 (26.1)
English Expression	32.0** (32.7)	33.0 (32.4)	30.9** (31.0)	34.2 (34.0)
Math. Computation	33.1 (33.7)	33.6 (33.0)	33.0* (33.1)	33.6 (33.5)
Math. Concepts	24.1 (24.5)	24.5 (24.0)	24.7** (24.8)	23.8 (23.7)

[a]Observed means in parentheses

*p<.05

**p<.01